Department of Agriculture, C. P.

REPORT

ON THE

NAGPUR EXPERIMENTAL FARM

IN THE

CENTRAL PROVINCES

FOR

THE YEAR 1901-1902.

Ending 31st March 1902.

Agents for the sale of Books published by the Central Provinces Administration.

IN ENGLAND.

E. A. ARNOLD, 37, Bedford Street, Strand, W. C., London.
CONSTABLE & CO., 2, Whitehall Gardens, S. W., London.
SAMPSON LOW, MARSTON & CO., St. Dunstan's House, Fetter Lane, E. C., London.
P. S. KING & SON, 9, Bridge Street, Westminster, S. W., London.
LUZAC & Co., 46, Great Russell Street, W. C., London.
KEGAN PAUL, TRENCH, TRÜBNER & CO., Charing Cross Road, W. C., London.
B. QUARITCH, 15, Piccadilly, W., London.
WILLIAMS & NORGATE, 7, Broad Street, Oxford.
DEIGHTON BELL & CO., Cambridge.

ON THE CONTINENT.

FRIEDLÄNDER & SOHN, 11, Carlstrasse, Berlin.
OTTO HARRASSOWITZ, Leipzig.
KARL W. HIERSEMANN, Leipzig.
ERNEST LEROUX, 28, Rue Bonaparte, Paris.
MARTINUS NIJHOFF, The Hague.

IN INDIA.

THACKER, SPINK & Co., Calcutta and Simla.
A. J. COMBRIDGE & CO., Bombay and Madras.
NEWMAN & CO., Calcutta.
THACKER & CO., LD., Bombay.
HIGGINBOTHAM & CO., Madras.
RAI SAHIB M. GULAB SINGH & SON, Lahore.
SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
V. KALYANARAM IYER & CO., Madras.
D. B. TARAPOREVALA, SONS & CO., Bombay.
MANAGER, GENERAL BOOK DEPÔT, Nagpur and Jubbulpore.

Digitized with financial assistance from
Hemendra Kothari
on 24 February, 2020

No. 174.
7

FROM

F. G. SLY, ESQ., I. C. S.,

COMMISSIONER OF SETTLEMENTS AND AGRICULTURE,

Central Provinces,

TO

THE CHIEF SECRETARY TO THE CHIEF COMMISSIONER,

REVENUE DEPARTMENT,

Central Provinces.

Nagpur, the 16th January 1902.

SIR,

I have the honour to submit the Annual Report on the working of the Experimental Farms, Nagpur and Telinkheri, for the year 1901-02.

NAGPUR EXPERIMENTAL FARM.

Character of the Season.

2. The early monsoon rainfall was below the average, but was sufficient for the successful sowing of autumn (kharif) crops. The rainfall during the second half of July and August was exceptionally heavy, but it was well distributed, and did no damage to the growing crops. The September rains were very light, whilst there was no rain whatever during the remaining six months of the year. The year's rainfall was thus fairly suitable for autumn crops. The outturns of juar, cotton and tur, which are the principal kharif crops grown on the Farm, were all equal to or above the average. It was, however, a disastrous season for spring (rabi) crops. The cessation of all rain after September resulted in the seed being sown in a somewhat dry bed in October and November. This was intensified by the absence of the usual winter rains, with the result that the plants withered. Linseed gave a fair yield in spite of the drought, but wheat and gram largely failed. The soil on the Farm is generally black soil of fair quality only, which quickly dries up, so that it is not really suited for the growth of rabi crops unless it is irrigated. It is situated in a kharif crop country, and the experiments with kharif crops have always been more successful than those with rabi crops.

Experiments with manures.

3. The principal experiments on the Farm are concerned with the trial of manures with and without rotation of crops and with and without irrigation. All manures have hitherto been given at fixed weights per acre irrespective of the actual manurial value of the material used. It has has now been arranged that in future the manures will be analysed every year, and will be used in varying amount so as to give a fixed quantity of nitrogen per acre. The yield of rabi crops was so poor, no matter what manure or treatment was given, that the year's experiments have not yielded much information. The result has been more or less the same during the past six years of dry seasons, and an examination of the outturns on the Farm clearly explains why the cultivators of the Nagpur country have largely abandoned the growth of rabi staples in favour of cotton and juar. This year's results generally corroborate those of previous years. Cattle-dung again stands alone as the best manure for wheat both with and without irrigation. This is already well-known

to all cultivators, but they require to be taught the large increase in its manurial value which results from proper methods of preparation and conservation. One system tried upon the Farm for some years is that known as the box-system, but it has not given better results than the system of ordinary pitting, whilst it is not a healthy system of cattle management. The experiment started five years ago to test whether cattle-dung can most profitably be applied to a wheat field in June at the commencement of the rains or in August in the middle of the rains has given no definite result. Bones have been experimented with as manure in several forms, bone-meal, crushed raw bones, and burnt bones, upon several crops—wheat, oilseeds, cotton and tur. The results have been very uniform and forcibly point to the conclusion that this manure cannot profitably be used for any of these crops upon the soil of the Farm. The outturns are seldom much larger, and indeed in some cases are smaller, than those of unmanured plots. Saltpetre has again shown that it can be profitably used as a manure, giving better results with than without irrigation. The experiments also show that a top-dressing of 80 lbs. per acre is much more valuable than three times that quantity drilled in with the seed. Green-manuring was not very successful during this year, owing to the dryness of the season. Rain is required to rot the green manure after it has been ploughed under, but the experiments show that the effect is cumulative and that it is a profitable system to employ. The 'Meagher' system of sewage disposal has been entirely successful. A bulletin describing this system has been published, and it is hoped that several municipalities will be induced to take it up.

Experiments with tillage.

4. The experiments under tillage are all confined to testing the effect of deep ploughing upon unirrigated wheat. The results are not conclusive, but tend to show that ploughing with the Swedish plough gives better yields than ploughing with the country plough.

New varieties of crop.

5. Experiments have been continued with several varieties of cotton. A new perennial variety, "Sea Island" received from the Saidapet Experimental Farm has been successfully grown but only with irrigation; its comparative merits have yet to be tested. The acclimatized "Upland Georgian" American cotton continues to give fairly good results grown as an ordinary kharif crop, but its yield is not so great as the coarse local varieties. Egyptian cotton continues to be successfully grown as an irrigated rabi crop, but other garden crops can be more profitably grown with a similar amount of care, and there is little hope of inducing local cultivators to take it up until it can be successfully grown as a kharif crop. Arrangements have now been made for the starting of experiments in the cross-breeding of cotton, by which it is hoped to improve the staple. Selected seed of the best varieties of maize (Jaunpur) and bajri (the awned variety) have been widely distributed with successful results. It is hoped that these will gradually replace the poor local varieties. A small quantity of seed of *Sorghum amber* and *collier*, which has proved a good fodder crop on the Farm, has also been distributed to selected cultivators. '*Paspalum dilatatum*' has entirely failed to justify its Australian reputation as a drought-resisting grass. The results of the experiments have been published in a Bulletin, where it has been shown that it failed to show any drought-resisting qualities, that it cannot survive the hot season without irrigation, that it is smothered out by hardy local varieties unless it is weeded and that it does not form good permanent pasture land.

Ensilage.

6. Some important experiments have been made with ensilage, both in an open stack and in a closed silo. The wastage in the former method from the rotting of the material exposed to the air is so great that the method cannot be profitably followed unless a very large stack is prepared and silage material is cheap. The closed silo has been entirely successful, maize and juar stalks and coarse grass turning into excellent ensilage. An experiment was made in using prickly-pear as a silage crop, but this failed.

Plant diseases.

7. Investigations into rust in wheat were continued, but as this year was free from rust no definite result was achieved. Several Australian rust-proof wheats were successfully grown, and

it is found that by using acclimatized seed, the crop comes to maturity earlier than by using fresh Australian seed. If they can be trained to become early varieties, their rust-resistent qualities may be developed. Cross-breeding experiments have also been started by raising hybrids of Australian and local wheats. The pickling of seed in a solution of sulphate of copper has continued to be quite successful in the eradication of smut in juar. Arrangements have been made for demonstrating this method on a large scale in villages in juar-producing tracts.

Implements.

8. The most successful new implement tried during the year was an American Ensilage Fodder Cutter and Shredder. This cuts into short lengths juar and other stalks, which cattle readily eat, thus avoiding all waste in feeding. The machine has caught on quickly in the juar country, and several have already been sold. A new winnowing machine obtained from America has also given very satisfactory results. A Cooke's Turn-wrest plough has been tried successfully ; it is a strong implement which works well in heavy black soil, being particularly suitable for breaking up waste land. Among, the implements tried in previous years, the Swedish plough has continued to be popular.

9. Considerable efforts have been made to enlarge the utility of the Farm by introducing to the notice of cultivators any successful results which have been achieved by the experimental work. Mr. R. S. Joshi, then Farm Superintendent, has done much good work in inducing cultivators to visit the Farm. The distribution of selected seed and of seed of improved varieties of crops has been taken up on a much larger scale. A scheme has now been sanctioned for the creation of a small Agricultural Department, whose principal work will be the demonstration of improved methods of agriculture in the several districts of the Province. And Mr. Joshi has been set free from the Farm and appointed Agricultural Assistant for the purpose of organizing and managing this work. The Department of Agriculture has thus for the first time been placed in a position to undertake practical work in the districts.

The Sewage Farm

10. The sewage farm has been successfully managed. Its working now shows a substantial profit, owing to the rents of the cultivators having been raised. The rate of Rs. 75 an acre realized for the land with the use of sewage and irrigation, shows what can be done by municipalities in this way, whilst the magnificent crops raised by the Kachi cultivators are an object lesson in careful methods of garden cultivation.

The Telinkheri Farm.

11. This Farm which was started in 1899 is gradually being brought into good order. It is now almost self-supporting. The extra land will be a valuable adjunct to the Experimental Farm for the purpose of raising crops for seed distribution. The Fuel are Fodder reserves have yielded a good profit. Arrangements have now been completed for starting a small cattle-breeding farm.

The Agricultural School.

12. The agricultural school has done a successful year's work. All the students of the senior class were successful in passing the final examination. The arrangements for the examination were improved by enlisting the services as examiners of gentlemen unconnected with the school. The junior class did not fill well, owing to the raising of the educational standard for admission, but this is probably only a temporary check, whilst a much better class of student has been obtained. A fund has been endowed by Rai Bahadur Chandar Kumar Chhatterji for the grant of a silver medal annually to the best student in practical agriculture. The result of the first year's competition was very successful, and it is hoped that this endowment will lead to improvement in practical work. The normal classes of schoolmasters were well filled. A new departure has been sanctioned whereby a new class has been added for the instruction in vernacular of the sons of cultivators who intend to make farming their profession in life, the object being to give sound instruction in practical farming rather than theoretical agriculture. A boarding-house has been constructed on land adjoining the Farm, but this has been found insufficient to accommodate the whole of the large number of students attending

the school, so that sanction has been given to its enlargement. The present school-rooms are very unsuitable, but this will be remedied when the new Victoria Technical Institute is built, which will contain excellent class-rooms and laboratories for the use of the agricultural school.

I have the honour to be,

Sir,

Your most obedient Servant,

F. G. SLY,

Commissioner of Settlements and Agriculture.

Secretariat Press, Nagpur :—J. E. A., 18-1-1903—380.

TABLE OF CONTENTS.

NAGPUR FARM.

	PAGE.
I.—History of the Farm	1
II.—Character of the season	*ib*
III.—Experiments with manures	2
IV.—Rotation experiments without manures	9
V.—Rotation experiments with manures...	10
VI.—Experiments with mixtures of crops...	13
VII.—Experiments with tillage	14
VIII.—Variety of crops	15
IX.—Experiment with plant diseases	16
X.—Trial of implements	17
XI.—Distribution of seeds and implements	*ib*
XII.—Cattle-breeding	19
XIII.—Fodder and Forest Reserves	*ib*
XIV.—Sewage Farm	*ib*
XV.—Agricultural Class	20
XVI.—Financial results	22

TELINKHERI FARM.

I.—History	*ib.*
II.—Its management	*ib*
III.—Experiments	*ib*
IV.—Financial results	23

No. 201.

FROM

MR. BHAYALAL DUBEY, L. AG.,

OFFG. SUPDT., GOVT. EXPERIMENTAL FARM,

Nagpur,

TO

THE COMMISSIONER OF SETTLEMENTS AND AGRICULTURE,

Central Provinces.

SUBJECT:

Report on the Nagpur and Telinkheri Experimental Farms for the year 1901-02.

Nagpur, the 21st July 1902.

SIR,

I have the honour to submit the Annual Report on the working of the Experimental Farms at Nagpur and Telinkheri for the year ending the 31st March 1902.

I.—HISTORY OF THE NAGPUR FARM.

History.

2. The Nagpur Experimental Farm was established in 1883, in which year the former Model Farm was given up and the present site selected in its stead. The land is close to Nagpur and is moderately typical of the black cotton soil which is to be found in the Central Provinces. It consists of a fairly level piece of land of about 90 acres in extent, out of which about 70 acres are under cultivation, the rest being occupied by roads, buildings and waste land. The soil is of the black cotton type, but of somewhat inferior quality. It varies in depth from 4 to 10 feet and is situated upon gneiss rock. The natural drainage is, however, bad, and crops frequently suffer in consequence. The road to Ambajheri which intersects the Farm acts as an embankment which holds up the water. New drains were opened in 1896, but they have not improved the drainage of the Farm as much as could be desired.

II.—CHARACTER OF THE SEASON.

Season.

3. The following table compares the rainfall of the year as registered on the Farm with the average of the preceding 27 years:—

Rainfall, 1901-02.

Month.	Number of rainy days.	Rainfall.	Average of 27 years preceding.	Month.	Number of rainy days.	Rainfall.	Average of 27 years preceding.
		Inches.	Inches.			Inches.	Inches.
				Brought forward ...	49	37·54	43·72
April ... 1st half ...	5	2·07	·14	October. 1st half ...	...	...	1·23
April ... 2nd half ...	1	·50	·27	October. 2nd half ...	...	...	1·28
May ... 1st half ...	...	·07	·22	November. 1st half ...	...	...	·62
May ... 2nd half ...	1	·19	·26	November. 2nd half ...	...	...	·18
June ... 1st half ...	2	·53	2·78	December. 1st half ...	...	...	·11
June ... 2nd half ...	4	4·84	5·04	December. 2nd half ...	...	...	·27
July ... 1st half ...	4	1·04	6·85	January. 1st half ...	...	...	·40
July ... 2nd half ...	9	6·92	7·54	January. 2nd half ...	...	...	·20
August .. 1st half ...	9	8·89	6·88	February 1st half ...	...	...	·20
August .. 2nd half ...	6	7·42	4·98	February 2nd half ...	...	...	·26
September. 1st half ..	3	2·15	4·63	March .. 1st half ...	...	...	·23
September. 2nd half ...	5	2·92	4·13	March .. 2nd half ...	...	...	·16
Total carried over ...	49	37·54	43·72	GRAND TOTAL ...	49	37·54	48·86

NOTE.—A rainy day is taken as one on which there was a fall of not less than 10 cents.

4. The rainfall in the first fortnight of April affected the quality of the crops on the threshing floor, especially wheat.

The monsoon arrived in June and the sowings of kharif crops were undertaken in due time. The rainfall in July and August being well distributed was favourable to cotton which did not suffer from water-logging. The September rains were only light. The remaining six months of the year under report were rainless. The rainfall of the whole year amounted to 32·84 as against an average of 48·72 inches last year.

5. The season was favourable to cotton and juar, and their outturns were on the whole good. Tur, which does not generally suffer from a dry season, was not affected by the absence of rain in the latter half of the year under report.

The rabi crops were sown in due time. The light rainfall of September followed by the dry months of October, November and December affected the wheat crop which bore undeveloped ears of shrivelled grain. The linseed crop did not thrive at the start, but gradually the plants became vigorous and bushy, finally giving a good outturn.

III.—EXPERIMENTS WITH MANURES.

6. The different manures experimented with on the Farm fall into two classes, *viz.*, natural and chemical.

Manure.

The natural manures are :—

(1) Box-dung.
(2) Stall-dung.
(3) Saltpetre.
(4) Bone-dust.
(5) San-hemp (*Crotolaria juncea*) ploughed in green.
(6) Kadoojira (*Vernonia cineria*).
(7) Ashes of cattle-dung.

The chemical manures are :—

(1) Ammonium chloride.
(2) Calcium superphosphate.
(3) Potassium sulphate.
(4) Calcium sulphate.

No description of the chemical manures is necessary. That of the natural manures is given below :—

(1) *Box-dung.*—Box-dung is prepared at the Farm in the following manner :—A pit measuring 10′ × 10′ and 2′ 6″ deep is dug in the cattle-shed and is bricklined on four sides. A pair of bullocks is tied in the pit. The excrements (both liquid and solid) of the former full in the pit, and the little straw that is left uneaten in the manger is spread over them in the morhing when the bullocks are let out either for work or for grazing. It takes generally from five to six months for the pit to be filled up to the top. The manure is then carted away and deposited in an ordinary pit dug in the ground for storing manure. The pits are covered over with straw to check evaporation, and are watered occasionally in the hot weather between March and June. The manure is not used until the lapse of one year from the date of deposit.

As this manure contains about one-half litter, the amount (*viz.*, 240 maunds) which is applied to an acre of land is larger than the 160 maunds of stall-dung manure which is used on an acre, since the stall-dung manure contains no litter.

(2) *Stall-dung.*—The term stall-dung is applied to dung collected from the cattle-shed from day to day and stored in an ordinary pit. This manure is also covered over with straw and watered at intervals in the hot weather. It contains no urine but only the solid excrements of the bullocks unmixed with straw.

(3) *Saltpetre.*—The saltpetre that is used on the Farm is crude saltpetre, obtained from Cawnpore through the Director of Land Records and Agriculture, United Provinces of Agra and Oudh. It is of two descriptions, black and white, the latter being a purer variety. The amount of saltpetre applied in the Farm is 240 lbs. to the acre, and it is, as a rule, drilled in with the seed. A sample similar to that used in the year under report was analysed by the Agricultural Chemist in 1895-96. The results of that analysis were given in the Farm Report of that year.

(4) *Bone-dust.*—This manure is prepared in the following manner :—Bones of animals are ground in a mill, such as is usually used for grinding lime (chunam). They are then passed through a sieve, and the fine powder resulting is applied at the rate of 360 lbs. to the acre, the method of application being the same as for saltpetre.

(5) *San-hemp* (*Crotolaria juncea*) *ploughed in green.*—The seed of the hemp is sown broadcast at the beginning of the rains at the rate of 100 lbs. per acre. In the middle of August, as the plants approach maturity, they are uprooted by hand and are buried in the furrows made by the Swedish plough. The plant, san-hemp, is one of the order *Leguminosæ*, Sub-division *Papolionacæ*, which possesses the property of storing nitrogen from the atmosphere by the aid of nodules at its roots.

(6) *Kadoojira* (*Vernonia cineria*).—This weed grows in abundance on the waste lands of the Farm. It is collected from these waste lands and is ploughed in by the same method as has been described above in the case of san-hemp.

(7) *Ashes of Cattle-dung.*—Cattle-dung is collected and made into cakes, which, when dry, are burnt and reduced to ashes; 3,080 lbs. are applied per acre.

Experiments with different manures.

7. Twelve experiments were carried on to test the comparative value of different manures or different methods of manuring. Perhaps the most important are those which are conducted on the two series of plots called A and B, in which wheat is annually manured with different materials, the only difference in the treatment being that the A series is irrigated whilst the B series does not receive irrigation. Series A was started *eighteen years ago*, series B *twelve years ago.*

In fields Nos. 18 and 32 the effect of manuring wheat with a green crop ploughed into the land in August is compared with the outturn of land manured with cattle-dung. The effect also on the wheat crop of saltpetre is tested in fields Nos. 68 and 23, the former of which is irrigated. In fields Nos. 15 and 55 wheat is manured with cattle-dung, which is put on the land at different periods, two plots being manured in June and two others in August.

A series of plots are manured on the system devised by Mr. G. Ville, and the crop is wheat. Lastly, in fields Nos. 9 and 59 an experiment to test the effect of phosphatic manures on different oil-seeds such as safflower (*Carthamus tinctoreus*), til (*sesamum*), linseed and mustard is tried. This is an experiment suggested by Dr. Leather, *vide* paragraph 3 of Annexure E to the Report for 1895-96. All the available fields had in previous years been manured on the system initiated by Lieutenant Meagher, and this year they were sown with juar.

8. The results obtained in the case of each of these experiments during the year under report are tabulated in the following statements, together with those of previous years, and such remarks as are deemed necessary are added in each case:—

SERIES A. SUBJECT.—Effect on wheat grown continuously of different kinds of manures applied year after year with irrigation.

Plot I.—Area 1·10 acre. Manured with saltpetre 240 lbs. per acre.
" II.— " 1·10 " " bone-dust 360 lbs. per acre.
" III.— " 1·10 " " saltpetre 240 lbs. and bone-dust 360 lbs. per acre.
" IV.— " 1·10 " " cattle-dung 160 maunds per acre.
" V.— " 1·10 " " cattle-dung 160 maunds and bone-dust 360 lbs. per acre.
" VI.— " 1·10 " " ashes of 160 maunds cattle-dung per acre.
" VII.— " 1·10 " Unmanured.
" VIII.— " 1·10 " Green manured with san-hemp.

Commenced in 1890-91. Irrigated once in November (27th to 29th). Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.							Cost of cultivation per acre.	Cost of manuring per acre.	COST OF IRRIGATION.		Gain in value on plot No. VII.
	Average of preceding 5 years (1890-91 to 1894-95).		Average of preceding 5 years (1895-96 to 1900-01) excluding 1899-1900.		1901-02.					Labour.	Assumed water-rate per acre of watering.	
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.					
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
I ...	931	1,789	826	1,041	681	790	33 0 11	17 12 2	16 10 0	0 15 0	2 0 0	19 10 8
II ...	626	954	534	692	390	650	19 14 1	17 12 2	3 6 0	0 15 0	2 0 0	6 7 10
III ...	1,012	1,924	776	1,078	670	710	32 12 0	17 12 2	20 0 0	0 15 0	2 0 0	19 5 9
IV ...	717	1,217	915	1,195	1,075	1,135	52 8 6	16 1 6	13 12 0	0 10 0	2 0 0	39 2 3
V ...	739	1,343	853	1,357	736	744	35 13 6	17 3 0	17 2 0	0 10 0	2 0 0	22 7 3
VI ...	584	915	618	740	411	429	20 1 1	16 14 0	13 7 10	0 10 0	2 0 0	6 10 10
VII ...	486	820	371	473	262	437	13 6 3	17 1 4	.....	0 15 0	2 0 0	...
VIII ...	564	1,090	558	821	624	676	30 8 10	15 4 2	9 11 10	0 15 0	2 0 0	17 2 7

Wheat was sown on the 19th of October and harvested on the 25th February. The plots stand thus in the order of field as regards grain—IV, V, I, III, VIII, VI, II, VII. Though the main object of this series was to show the effect on wheat grown continuously on different kinds of manures applied year after year with irrigation, the figures tend to show some other valuable results.

The plot manured continuously with saltpetre is giving a smaller and smaller outturn each year as will be seen from a comparison of the averages of five years. The saltpetre contains only nitrogen and potash, and it exercised its well-known effect on the soil which was already stocked with other elements of nutrition. But the soil can bear this drain of other nutrients only up to a certain point, and hence the application of saltpetre does not show now such effective outturns as it did in the earlier years, because the soil does not contain the other elements of fertility to such an extent as it did before.

Bone-dust has not shown good results as yet on the Farm, and how far its value as a manure can be recommended is yet uncertain. The results of the application of bone-dust and saltpetre as a mixed manure are, I believe, as clear as those of the saltpetre alone, bone-dust being of indifferent manurial value.

The superiority of cattle-dung (a general manure), as shown by the average figures of plots IV and V, is fully established. When dung is applied continuously the accumulation of organic matter increases and the acquired fertility also increases. The outturns in the former years are lower, because the cattle-dung applied in previous years contained most of its nitrogen in the organic form and this took sometime to be converted into nitric acid, which, combining with bases, produces the nitrates in which form only the nitrogen is taken up by the roots; hence the dung applied in previous years supplies active ingredients afterwards.

The figures of plot No. VI can be regarded as showing that the fertility of soil cannot be upheld by the addition of mineral matter only, but that there must be some supply of organic matter which generally contains most of the useful ingredients and also improves the mechanical condition of the soil.

The results of plot No. VII are natural enough proving that the soil is getting exhausted.

The results of plot No. VIII show that the outturns are increasing day by day as they do in the case of cattle-dung. Green manuring being general in its action, can therefore be used as a substitute for farm-yard manure.

SERIES B. SUBJECT.—Effect on wheat grown continuously of different kinds of manures applied year after year without irrigation.

Plot I.—Area ·10 acre. Manured with saltpetre 240 lbs. per acre.
„ II.— „ ·10 „ „ bone-dust 360 lbs. per acre.
„ III.— „ ·10 „ „ saltpetre 240 lbs. and bone-dust 360 lbs. per acre.
„ IV.— „ ·10 „ „ cattle-dung 160 maunds per acre.
„ V.— „ ·10 „ „ cattle-dung 160 maunds and bone-dust 360 lbs. per acre.
„ VI.— „ ·10 „ „ ashes of 160 maunds cattle-dung per acre.
„ VII.— „ ·10 „ Unmanured.
„ VIII.— „ ·10 „ Green manured with san-hemp.

Commenced in 1884-85. Unirrigated. Crop—wheat (*haura*—Nagpur.)

Number of plot.	OUTTURN PER ACRE.									Cost of cultivation per acre.	Cost of manuring per acre.	Grain in value of plot No. VII.
	Average of five years, 1885—89.		Average of five years, 1890—94.		Average of preceding five years excluding 1899-1900, 1895-96 to 1900-01.		1901-02.					
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.			
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
I ...	1,133	1,711	751	1,468	514	733	290	414	14 9 0	15 0 0	16 10 0	4 15 9
II ...	891	1,388	534	882	350	578	237	322	11 13 6	15 5 0	3 6 0	2 4 3
III ...	1,094	1,751	865	1,538	462	702	287	392	14 3 8	15 8 4	20 0 0	4 12 5
IV ...	913	1,520	627	1,393	365	635	427	672	21 10 9	15 8 4	12 8 10	12 1 6
V ...	953	1,415	666	1,224	532	857	709	1,001	35 9 2	14 3 6	17 5 4	25 15 11
VI ...	949	1,598	576	1,125	359	597	410	570	20 8 7	14 3 6	14 4 4	10 15 4
VII ...	799	1,297	418	796	197	395	190	280	9 9 3	15 0 0	...	...
VIII ...	705	1,137	584	1,115	254	486	375	505	18 11 7	13 6 2	9 11 10	9 2 4

This series is the duplicate of the A series, but the plots are not irrigated. The general remarks on the A series plots apply to this series also, but the results are not so regular, chiefly because all the outturns have been very low. By comparing the outturns of the two series in the year under report, it is easily seen how far irrigation helps to increase the yield. The crop this year suffered from want of moisture, and consequently the outturn figures are too low to afford much information. It is, however, to be noted by the outturns of 1st, 2nd and 3rd plots that in such dry rabi seasons, as the one under report, the crop cannot make much use of the saltpetre applied as manure. The result of cattle-dung is very abnormal this year. The outturns of the 5th, 6th and 7th plots are but natural, as the green manured plot can only show profitable outturns in years with sufficient rains to supply the moisture required for decomposition.

FIELD NO. 18. SUBJECT.—*Relative effect of green manuring, box-dung and stall-dung on wheat grown continuously.*

Plot I.—Area ·25 acre. Green manured with san-hemp.
„ II.— „ ·25 „ Unmanured.
„ III.— „ ·25 „ Manured with box-dung at 240 maunds per acre.
„ IV.— „ ·25 „ Manured with stall dung at 160 maunds per acre.

Commenced in 1890-91. Unirrigated. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.							Cost of cultivation per acre.	Cost of manuring per acre.	Gain in value on plot No. II.
	Average of five years, 1890-91 to 1894-95.		Average of preceding five years, excluding 1899, 1895-96 to 1900-01.		1901-02.					
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.			
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
I ...	594	878	231	394	210	404	10 14 10	12 11 8	8 11 8	3 15 3
II ...	473	727	258	416	134	357	6 15 7	15 1 0	...	...
III ...	657	1,179	525	862	528	1,024	27 8 2	14 7 0	13 12 0	20 8 7
IV ...	624	878	605	987	520	964	26 14 11	14 7 0	13 6 4	19 15 4

The outturns of these plots are very low as compared with those of last year. The plots manured with stall-dung and box-dung have maintained their position; but the green manured plot gave a very low outturn. The outturn figures for the last five years show that the years have been unfavourably dry for carrying out successful experiments in green manuring on this plot; it may be that the plot is too well drained and does not retain moisture for the successful decomposition of the green manure ploughed in the soil. The green manure can only be successful if the field gets sufficient rain after the crop is ploughed in, to provide the stores of moisture to hasten its decomposition, whereby the crop ploughed in as green manure may yield to the growing crop the manurial ingredients with which the former was stocked.

FIELD NO. 32. SUBJECT.—*Effect on wheat of green manuring with cut weeds collected from waste land on the Farm.*

Plot I.—Area ·16 acre. Green manured with san-hemp in year under report.
„ II.— „ ·16 acre. Unmanured.

Commenced in 1891-92. Unirrigated. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.														Cost of cultivation per acre.	Cost of manuring per acre.	Gain in value on plot No. II.
	Average of preceding five years 1891-92 to 1895-96.		1896-97.		1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.					
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Value.			
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
I ...	759	1,345	329	452	562	1,187	509	648	Wheat not sown owing to lack of moisture in the soil.	762	1,150	385	621	19 9 6	15 9 6	9 3 11	0 2 9
II ...	551	1,000	333	535	498	1,027	412	662		540	779	383	598	19 6 9	18 8 4	...	...

This experiment—the duplicate of the 1st two plots of the last—shows also that in a season like the present green manuring does no good. Generally, however, the outturns of the manured plot are more than those of the unmanured one.

FIELDS NOS. 23 AND 68. SUBJECT.—*Effect on wheat of manuring with saltpetre at different rates per acre with and without irrigation.*

FIELD NO. 23.—*Unirrigated.*

Plot I.—Area ·30 acre. Unmanured.

„ II.— „ ·30 „ Manured with 240 lbs. of saltpetre per acre (80 lbs. drilled with the seed and 160 lbs. top-dressed).

„ III.— „ ·30 „ Manured with 80 lbs. of saltpetre per acre as top-dressing.

FIELD NO. 68.—*Irrigated.*

Plot I.—Area ·10 acre. Unmanured

„ II.— „ ·10 „ Manured with 240 lbs. of saltpetre per acre (80 lbs. drilled with the seed and 160 lbs. top-dressing).

„ III.— „ ·10 „ Manured with 80 lbs. of saltpetre per acre as top-dressing.

Commenced in 1897-98. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE (FIELD No. 23).										Number of plot.	OUTTURN PER ACRE (FIELD No. 68).									
	1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.				1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.			
	Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Value.	Gain on plot No. I.		Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Value.	Gain on plot No. I.
	lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.		lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
I ..	345	678	244	426	Wheat not sown owing to lack of moisture in the soil.	343	592	217	400	11 3 8	...	I ...	620	910	377	422	Wheat not sown owing to lack of moisture in the soil.	450	770	304	346	14 15 2	...
II ...	372	672	282	465		322	502	214	376	11 0 1	0 3 7	II ...	999	1,231	1,059	1,091		730	1,380	595	615	29 0 5	14 1 3
III ...	413	767	290	527		365	541	238	442	12 5 3	1 1 7	III ...	1075	1,305	1,202	1,247		930	1,530	902	927	43 15 9	29 0 7

NOTE.—Field No. 68 was irrigated once in November (26th and 27th).

The results of the application of 80 lbs. saltpetre (in irrigated as well as in unirrigated plots) are shown to be the most useful and economical. It must be because the crop cannot utilize as much as 240 lbs. and the surplus quantity is washed off by rain. We cannot yet say for certain that 80 lbs. application is the best unless an experiment is made with a still greater quantity. It may, however, be safe to state that the maximum of 240 lbs. is not economical, but we have yet to see which is the optimum quantity—the minimum being near about 80 lbs.—to give us proportionally the most profitable results. Here also we see that saltpetre gives better results when the crop is irrigated.

FIELDS NOS. 15 AND 55. SUBJECT.—*Effect of manuring wheat at different times of the year*, i. e., *June and August.*

FIELD NO. 15.

Plot I.—Area ·23 acre. Manured with 160 maunds dung in June.

„ II.— „ ·23 „ Manured with 160 maunds dung in August.

Soil—(Low-lying) Morand doyam.

FIELD NO. 55.

Plot I.—Area ·27 acre. Manured with 160 maunds dung in June.

„ II.— „ ·27 „ Manured with 160 maunds dung in August.

Soil—(High-lying) Morand awal.

Commenced in 1897-98. Unirrigated. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE (FIELD No. 15).										Number of plot.	OUTTURN PER ACRE (FIELD No. 55).									
	1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.				1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.		
	Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Value.		Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Value.
	lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.		lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.
I ...	220	498	222	483	Wheat not sown owing to lack of moisture in the soil.	278	478	215	464	11 5 11	I	258	519	276	520	Wheat not sown owing to lack of moisture in the soil.	358	687	161	406	8 11 8
II ...	166	312	206	398		322	521	228	520	12 2 8	II	181	389	209	402		366	660	110	242	5 13 4

In Field No. 15 the outturn of the plot manured in August is greater than that which was manured in June, while in Field No. 55 the reverse is the case. But the results of these experiments do not prove anything definite, and this irregularity may perhaps be attributed to the unhappy site of the fields, as Field No. 15 is liable to erosion and No. 55 suffers from the damage done by babul trees, so that this year there was no crop in one-third of the area.

VILLE SERIES. SUBJECT.—*Practical method of soil analysis by using chemical manures as devised by Mr. George Ville.*

Plot I.—Area '05 acre. Manured with Ammonic chloride 140 lbs. per acre.
" " Calcic superphosphate 180 lbs. per acre.
" " Potassic sulphate 90 lbs. per acre.
" " Calcic sulphate 100 lbs. per acre.
" II.— " '05 " " as above, less Calcic superphosphate.
" III.— " '05 " " as in plot No. I, less Ammonic chloride.
" IV.— " '05 " No manure.
" V.— " '05 " Manured as in plot No. I, less Potassic sulphate.
" VI.— " '05 " " " " Calcic sulphate.

Commenced in 1900-01. Unirrigated. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.				
	1900-01.		1901-02.		
	Grain.	Straw.	Grain.	Straw.	Value.
	lbs.	lbs.	lbs.	lbs.	Rs. a. p.
I	580	940	492	767	24 15 2
II	580	1,280	480	720	24 3 9
III	480	1,020	485	1,155	26 0 10
IV	560	940	400	600	20 3 2
V	580	860	345	555	17 8 11
VI	510	790	280	500	14 6 10

Ville Series.—The absence of cold-weather rains has vitiated the results of these experiments as they do in the case of others, because the best results are obtained when there is sufficient moisture and the plants live the prescribed period to use the food supplied. In seasons like the present there was no moisture in the first place, and consequently the plants having ripened prematurely did not use the full quantity of plant food.

Last year's experience from this series is (1) that the plot which has received all manures but calcic superphosphate has shown best results, being in accord with the fact that the Farm soil contains sufficient phosphoric acid and lime; (2) that the soil lacks nitrogen as shown by the 3rd plot which was manured with all but ammonic chloride.

The unmanured plot showed rather high figures last year than those of the year under report. Last year the 5th and 6th plots did not suffer so much from the absence of potassic sulphate and calcic sulphate, respectively, but quite different is our experience in the year under report. It is difficult to explain this irregularity unless we suppose that the least quantity of these ingredients already present in the soil was used up mostly in that very year and that it was deficient in the soil The figures of the plot wanting in ammonium chloride were proportionally too high when compared with those of the last year. The requirements of the various crops being different, the system can teach us the relations of soils only with the particular crop we experiment upon. Hence it is not of much practical value to give us an idea about the approximate composition of soil as far as the crops, other than the particular one experimented with, are concerned.

FIELD NO. 9. SUBJECT.—*Effect of phosphatic manures on different oil-seeds.*

Plot I.—Area ·27 acre. Unmanured.
" II.— " ·27 " Manured with saltpetre 281·9 lbs. per acre containing (20 lbs. nitrogen).
" III.— " ·27 " " burnt bones 277 lbs. per acre containing (100 lbs. phosphate).
" IV.— " ·27 " " raw bones 393 lbs. per acre. ditto
" V.— " ·27 " " " 393 lbs., containing (100 lbs. phosphate) and saltpetre 281·9 lbs. per acre containing (20 lbs. nitrogen).

Commenced in 1896-97. Unirrigated. Crop—linseed and mustard in year under report.

Number of plot.	Area.	OUTTURN PER ACRE. 1896-97. Crop.	Seed.	Stalks.	1897-98. Crop.	Seed.	Stalks.	1898-99. Crop.	Seed.	Stalks.	1899-1900. Crop.	Seed.	Stalks.	1900-01. Crop.	Seed.	Stalks.	1901-02. Crop.	Seed.	Stalks.
	Acres.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.
I-E ...	·14	Til.	243	714	Mustard.	...	...	Safflower.	592	1,170	Linseed.	...	1	Til.	125	443	Linseed.	95	255
II-E ...	·14	,,	362	936	,,	30	316	,,	724	1,508	,,	·48	6	,,	250	814	,,	184	678
III-E ...	·14	,,	221	671	,,	...	...	,,	687	1,380	,,	·96	11	,,	121	528	,,	87	355
IV-E ...	·14	,,	218	764	,,	...	...	,,	437	940	,,	...	...	,,	79	343	,,	98	273
V-E ...	·14	,,	154	654	,,	...	...	,,	313	710	,,	...	...	,,	87	343	,,	76	317
I-W ...	·13	Safflower.	384	778	Linseed.	304	427	Til.	16	77	Mustard.	...	...	Safflower.	521	1,417	Mustard.		
II-W ...	·13	,,	359	1,149	,,	295	512	,,	197	508	,,	...	...	,,	754	1,638	,,		
III-W ...	·13	,,	441	697	,,	236	395	,,	61	208	,,	...	...	,,	323	808	,,	Fallowed.	
IV-W ...	·13	,,	458	750	,,	196	373	,,	70	238	,,	...	...	,,	372	882	,,		
V-W ...	·13	,,	321	556	,,	79	152	,,	25	123	,,	...	...	,,	216	591	,,		

FIELD NO. 59. SUBJECT.—*Effect of phosphatic manures on different oil-seeds.*

Plot I.—Area ·31 acre. Unmanured.
" II.— " ·31 " Manured with saltpetre 281·9 lbs. per acre.
" III.— " ·31 " " burnt bones 277 lbs. per acre.
" IV.— " ·31 " " raw bones 393 lbs. per acre.
" V.— " ·31 " " raw bones 393 lbs. and saltpetre 281·9 lbs. per acre.

Nitrogen and phosphate quantity as above.

Commenced in 1896-97 Unirrigated. Crop—til and safflower in year under report.

Number of plot.	Area.	OUTTURN PER ACRE. 1896-97. Crop.	Seed.	Stalks.	1897-98. Crop.	Seed.	Stalks.	1898-99. Crop.	Seed.	Stalks.	1899-1900. Crop.	Seed.	Stalks.	1900-01. Crop.	Seed.	Stalks.	1901-02. Crop.	Seed.	Stalks.
	Acres.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.	lbs.
I-E ...	·15	Linseed	5	48	Til.	230	920	Linseed.	103	276	Til.	59	Not weighed.	Linseed.	133	266	Til	121	373
II-E ...	·15	,,	1	12	,,	382	1,413	,,	67	172	,,	29	,,	...	262	565	,,	238	787
III-E ...	·15	,,	5	49	,,	447	1,560	,,	121	299	,,	57	,,	...	191	369	,,	146	427
IV-E ...	·15	,,	6	47	,,	353	1,293	,,	132	357	,,	39	,,	...	135	345	,,	88	360
V-E ...	·15	,,	5	48	,,	337	1,040	,,	117	336	,,	9	,,	...	145	315	,,	166	567
I-W ...	·16	Mustard.	74	148	Safflower	922	1,897	Mustard.	162	361	Safflower	Not sown.	,,	Mustard.	215	460	Safflower	837	1,912
II-W ...	·16	,,	61	111	,,	857	2,137	,,	175	356	,,	,,	,,	...	337	581	,,	1,173	2,289
III-W ...	·16	,,	78	131	,,	947	2,253	,,	113	257	,,	,,	,,	...	237	506	,,	890	1,691
IV-W ...	·16	,,	144	281	,,	930	2,276	,,	62	218	,,	,,	,,	...	220	473	,,	750	1,500
V-W ...	·16	,,	65	116	,,	851	1,924	,,	137	342	,,	,,	,,	...	235	491	,,	896	1,829

Linseed commenced badly after germination, but it was not long before the plants began to present a bushy appearance and held out some substantial hopes. The soil of this field being low lying is not at all suitable to linseed much less to mustard.

Saltpetre has generally given the best outturns. Burnt bones are more effective than the raw material. It is strange that the mixture of raw bones and saltpetre did not give good results. On the whole the results of these experiments are very irregular. Linseed after til in rotation, as mentioned in last year's report, gives good results and is quite consistent. After the til harvest the land is left in pretty fair condition, free of weeds, &c. The til harvest being earlier it is a kind of fallowing, and this attended with proper tillage gives a fine seed bed for linseed.

Meagher System.

Number of fields.	Time of manuring after Meagher System.	Area.	Crop sown.	Outturn of grain per acre.	Remarks.
		Acres.		lbs.	
48 (a part), 49 (a part), 50 (half), 51 (a part) and 52.	Manured in April 1901 ...	4·57	Juar ...	1,873	
48 (half), 49 (a part) and 50 (half) ...	Manured in previous years ...	3·11	Do. ...	1,329	

9. This system of manuring has given as successful results as it has done in previous years. It has been the experience of past years as well as of the one under report that this manure gives the best outturns in the very year in which a field is manured. In after years the action of the manure gradually diminishes all its useful ingredients being used up in this time, and the land should be manured again.

IV.—ROTATION EXPERIMENTS WITHOUT MANURES.

Rotation.

10. These experiments were conducted in three different fields to test the practices observed by the cultivators of these provinces and to see whether their systems could in any way be improved. In field No. 29 wheat is followed by gram, juar, &c., or a fallow. In field No. 57 linseed is followed by cotton and other crops. In field No. 61 cotton-tur is followed by wheat and gram. The experiments so far as Nos. 29 and 57 are concerned are by far the most important and were started 11 years ago, while the experiment in field No. 61 began in 1893-94. The results are tabulated below and compared with those of previous years.

FIELD NO. 29. SUBJECT.—*Effect of rotation with wheat.*

Plot I.—Area ·13 acre. Wheat every year.
„ II.— „ ·13 „ Wheat and fallow alternately.
„ III.— „ ·13 „ Wheat and gram alternately.
„ IV.— „ ·13 „ Wheat and juar-tur (mixed) alternately.
„ V.— „ ·13 „ Wheat and kodon alternately.

Commenced in 1890-91. Unmanured and unirrigated. For cropping, see column 2 below.

Number of plot.	Crop.	OUTTURN PER ACRE.						
		Average of five years, 1890-91 to 1894-95.		Average of preceding five years excluding 1899, 1895-96 to 1900-01.		1901-02.		
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.
I	Wheat ...	578	560	540	784	287	520	14 13 2
II	Wheat and fallow ...	638	1,338	436	651	...	...	
III	Wheat ...	568	1,225	491	839	...	...	
	Gram ...	444	840	504	843	164	805	7 9 2
IV	Wheat ...	654	1,320	475	798	...	...	
	Juar and tur ...	164	2,298	677	4,596	175	909	48 8 9
		259	741	505	1,109	855	2,269	
V	Wheat ...	726	1,402	367	712	...	...	
	Kodon ...	399	658	494	921	418	812	Not saleable in Nagpur market.

During the year under report plot No. I was sown with wheat. Plot No. II remained fallow according to the plan of the experiment. Plot No. III was sown with gram on the 5th October 1901 and harvested on the 7th February 1902; but the outturn was much below the average, because the plants died off for want of moisture. Plot No. IV grew juar and tur which have given the best value in money. Plot No. V was sown with kodon yielding only an average outturn. The continuous wheat results are irregular, but to some extent natural as well Wheat after fallow has always given fair results, showing that fallowing may help the soil in maintaining its fertility to some degree, but the ordinary ryot cannot afford to make this sacrifice. This practice may perhaps be suitable for the owner of large holdings who can conveniently allow a plot of soil to lie fallow for a year. Wheat and gram in rotation have also given fair results in fair seasons, showing that it is a good rotation. The outturn of gram this year is very low. Wheat after kodon is not a good rotation, because the kodon is a very exhausting crop, and when followed by wheat without manure exhausts the soil. The practice of sowing wheat after juar-tur has in favourable years proved to be beneficial.

FIELD NO. 61. SUBJECT.—*Rotations with a mixture of cotton-tur.*

Plot I.—Area ·30 acre. Cotton-tur year after year.
„ II.— „ ·30 „ Cotton-tur in rotation with wheat.
„ III.— „ ·30 „ Cotton-tur in rotation with gram.

Commenced in 1893-94. Unmanured and unirrigated. For cropping, see column 2 below.

Number of plot.	Crop.	OUTTURN PER ACRE.											
		Average of preceding five years, 1893-94 to 1897-98.		1898-99.		1899-1900.		1900-01.		1901-02.			
		Grain or lint.	Straw or seed.	Grain or lint.	Straw or seed.	Grain or lint.	Straw or seed.	Grain or lint.	Straw or seed.	Grain or lint.	Straw or seed.	Value.	Cost of cultivation.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
I	Cotton ...	36	78	82	188	41	74	260	417	153	252	42 4 4	12 13 10
	Tur ...	372	908	116	431	...	75	157	860	204	703		
II	Cotton ...	58	121	...	...	209	374	...	...	110	181	45 13 0	11 9 3
	Tur ...	621	1,595	...	...	42	362	...	...	580	1,430		
	Wheat ...	388	653	426	740	...	...	489	1,204	...	...	...	...
III	Cotton ...	55	113	...	...	152	272	...	...	111	190	43 12 9	9 12 4
	Tur ...	511	1,322	...	...	18	282	...	...	516	1,302		
	Gram ...	371	546	251	332	...	...	509	853	...	...	...	...

The object of the experiment is to ascertain whether it is most profitable to grow cotton and tur year after year in the same field, or if rotation is desirable, whether wheat or gram would be the most suitable to rotate. The first plot outturn figures show that cotton and tur mixed is not a bad continuous crop; but it does not insure the cleanliness of a field, since by growing a kharif crop year after year on the same field we have only the summer at our disposal to prepare it. If we rotate a kharif crop with a rabi one, there is enough cultivation between the harvesting of kharif and sowing of rabi to keep the field clean.

V.—ROTATION EXPERIMENTS WITH MANURES.

Rotation with manure.

11. There are four experiments which come under this head. In fields Nos. 63 and 17 the experiment is intended to bring out the advantage of green manuring on a rotation of wheat and cotton. In field No. 44 the effect of the various manures—stall-dung, box-dung, and bone-dust—was tested on the following crops grown in rotation:—Cotton and wheat, wheat and tur.

Field No. 42-N was reserved to test the effect of phosphatic and potassic manures on tur (a nitrogen fixing crop) in rotation with wheat. The results obtained are noted below in tabular form :—

FIELD NO. 63. SUBJECT.—*Effect of green-manuring with san-hemp (Crotolaria—juncea) on wheat with fallow interposed, and on wheat in rotation with cotton.*

Plot I.—Area ·22 acre. Green-manuring followed by fallow and then by wheat.
„ II.— „ ·22 „ As above, but unmanured.
„ III.— „ ·22 „ Green-manuring followed by wheat and then by cotton.
„ IV.— „ ·24 „ As above, but unmanured.

Commenced in 1899-1900. For cropping, see column 2 below.

Number of plot.	Crop.	OUTTURN PER ACRE.							Remarks.
		1899-1900.		1900-01.		1901-02.			
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.	
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	
I	Wheat ...	...	...	665	1,280	...	...	...	Green-manured with san-hemp in year under report.
II	Wheat ...	...	...	595	1,064	...	...	...	
III	Wheat ...	Wheat not sown.		...	...	473	905	23 9 6	Do.
	Cotton ...	...	...	477	764	...	...	...	
IV	Wheat ...	Wheat not sown.		...	...	546	1,062	28 7 3	
	Cotton ...	...	...	537	862	...	...	...	

It is evident from the figures given in the table that green-manuring followed by fallow has decidedly given better results in the first plot. The mere fallowing in plot II shows the outturn in 1900-01 to be good when compared with the average of the year. The outturn of wheat in the unmanured plot No. IV is more than the green-manured plot. This experiment may tend to show that green-manuring followed by fallow is decidedly advantageous, because it gives sufficient time for the green-manuring to be decomposed and then to supply active ingredients to the crop.

FIELD NO. 17. SUBJECT.—*Effect on wheat and cotton in rotation of green-manuring with Kadoojira (Vernonia cineria).*

Plot I.—Area ·15 acre. Green-manured with cut weeds every alternate year.
„ II.— „ ·08 „ No manure.

Commenced in 1890-91. Unirrigated. Crop—cotton (jari) in year under report.

Number of plot.	Crop.	OUTTURN PER ACRE.									
		Average of five years, 1890-91 to 1894-95.		Average of preceding five years, 1895-96 to 1899-1900.		1900-01.		1901-02.			
		Grain or lint.	Straw or seed.	Grain or lint.	Straw or seed.	Grain.	Straw.	Lint.	Seed.	Value.	Cost of cultivation.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
I	Wheat ...	569	1,246	343	636	627	1,199	...	...	...	...
	Cotton ...	58	141	161	311	...	...	202	342	45 12 8	11 12 4
II	Wheat ...	347	816	226	398	381	719	...	...	...	...
	Cotton ...	43	112	133	261	...	...	145	264	33 2 1	9 11 2

The results in this experiment are much more regular, and they show that the outturn of wheat and cotton in the manured plot has always been greater than that of the unmanured plot.

FIELD NO. 44. SUBJECT.—*Relative effect on cotton and wheat in rotation, of box-dung stall-dung and bone-dust.*

Plot I.—Area '27 acre. Manured with stall-dung at 160 maunds per acre.
" II.— " '27 " " " box-dung at 240 maunds per acre.
" III.— " '27 " Unmanured.
" IV.— " '27 " Manured with bone-dust at 360 lbs. per acre.
Commenced in 1890-91. Unirrigated. Crop—wheat (*haura*—Nagpur) in year under report.

Number of plot.	Crop.	OUTTURN PER ACRE.							Cost of cultivation per acre.	Cost of manuring per acre.	Gain in value on plot No. III.
		Average of five years, 1890-91 to 1894-95.		Average of preceding five years excluding 1899, 1895-96 to 1900-91.		1901-02.					
		Grain or lint.	Grain or lint.	Grian or lint.	Grain or lint.	Grain.	Straw.	Value.			
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
I	Cotton ...	44	106	296	548	...	...	...	...	...	...
	Wheat ...	515	897	637	940	441	867	23 0 3	14 3 9	13 3 1	8 14 9
II	Cotton ...	59	137	391	697	...	...	...	...	...	...
	Wheat ...	643	958	762	1,469	429	853	22 6 1	14 3 9	14 6 10	8 4 7
III	Cotton ...	25	53	82	152	...	...	...	...	...	...
	Wheat ...	349	464	246	518	277	445	14 1 6	15 11 6	...	...
IV	Cotton ...	24	50	74	139	...	...	...	...	...	...
	Wheat ...	284	683	208	491	194	354	10 0 5	15 11 6	3 6 0	4 1 1

As regards this experiment also, it is worthy of remark that the plot manured with bone-dust has invariably shown hopeless results as compared with those of the unmanured plot. The average outturns of the box-dung plot are greater than those of the stall-dung, while in the year under report the contrary is the case.

FIELD NO. 42-N. SUBJECT.—*Effect on tur and wheat grown in rotation of potassic and phosphatic manures.*

Plot I.—Area '15 acre. Manured with powdered bones, 360 lbs. per acre and potassic sulphate 90 lbs. per acre.
" II.— " '15 acre. Unmanured.
Commenced in 1896-97. Crop—wheat in year under report.

Number of plot.	Crop.	OUTTURN PER ACRE.												
		1896-97.		1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.			
		Grain.	Stalks.	Grain.	Straw.	Grain.	Stalks.		Grain.	Stalks.	Grain.	Straw.	Value.	Gain on plot No. II.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
I	Tur ...	756	1,422	...	...	564	1,020	Wheat not sown owing to lack of moisture in the soil.	683	1,903	...	...	...	...
	Wheat ...	...	...	414	899	...	...		...	...	342	617	17 10 5	—2 8 7
II	Tur ...	656	1,372	...	...	525	945		892	2,115	...	...	...	...
	Wheat ...	...	...	327	810	...	...		...	...	395	658	20 3 0	...

In the first three years the outturns of the plot manured with bones and potassic sulphate were good, but for the last two years better results have been obtained in the unmanured plot.

VI.—EXPERIMENTS WITH MIXTURES OF CROPS.

Mixtures of crops.

12. These experiments were started with the object of testing the expediency of the practice of cultivators of the province in growing crop mixtures. Two fields were allotted for conducting these experiments. The experiment in field No. 25 of mixing gram and wheat, known in the Nerbudda valley as *birra*, was commenced in 1890-91; while the experiment of mixing (1) juar and cotton and (2) cotton and tur in field No. 55 was begun in 1893-94. The results attained this year in the case of each of these experiments are contrasted below with those of previous years.

FIELD NO. 25. SUBJECT.—*Effect of mixing crops—wheat and a leguminous crop (gram).*

Plot I.— Area ·21 acre. Wheat sown alone.
„ II.— „ ·21 „ Wheat mixed with gram.
Commenced in 1890-91. Unmanured and unirrigated. Crop—wheat (*haura*—Nagpur) and gram.

Number of plot.	Crop.	OUTTURN PER ACRE.						
		Average of five years, 1890-91 to 1894-95.		Average of preceding five years excluding 1899, 1895-96 to 1900-01.		1901-02.		
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.
I	Wheat ...	420	616	242	426	85	220	4 10 1
II	Wheat ...	290	458	178	327	55	121	4 2 4
	Gram ...	161	275	56	114	31	88	

The site of the field is high and when the cold-weather rains fail, as they did in the year under report, both the crops suffer. The averages of the first five years prove that the produce is greater in the mixed plot. The results of the last two years cannot be relied on for any conclusion as the seasons were bad. It is noted, however, that the mixture is not a good crop on the Farm. In the chief wheat-producing districts of the north of the provinces it is a very favourite mixture, and is known as *birra*.

FIELD NO. 55. SUBJECT.—*Effect of mixing crops—principal one being cotton with tur and juar.*

Plot III.—Area ·27 acre. Cotton (Jari) alone.
„ IV.— „ ·27 „ „ (Jari) and tur in the proportion of 6 lines to 2.
„ V.— „ ·27 „ „ (Jari) and juar in the proportion of 6 lines to 2,
Commenced in 1895-96. Unmanured.

Number of plot.	Crop.	OUTTURN PER ACRE.					Cost of cultivation per acre.	Gain in value on plot No. III.
		Average of preceding five years excluding 1899 (1895-96 to 1900-01).		1901-02.				
		Grain or lint.	Straw or seed.	Grain or lint.	Straw or seed.	Value.		
		lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
III	Cotton ...	139	263	200	342	45 6 2	16 2 0	...
IV	Cotton ...	84	162	146	244	51 6 10	14 8 4	6 0 8
	Tur ...	532	1,084	527	966			
V	Cotton ...	69	134	89	152	50 5 9	*12 7 4	4 15 7
	Juar ...	368	1,561	321	1,592			

* Excluding cost of watching juar.

The general results of the past years as well as those of the year under report show that it is more profitable to grow the mixture of cotton and tur or cotton and juar than cotton alone.

VII.—EXPERIMENTS WITH TILLAGE.

Tillage.

13. The first experiment was started in 1890-91 in order to test the practice of cultivators who merely scarify the ground for sowing wheat. The field is divided into three plots. The first plot is ploughed every year, the second is scarified (bakhared) every year, and the third is ploughed and scarified in alternate years. In accordance with instructions conveyed in paragraph 3 of Secretariat letter No. 869, dated the 13th February 1897, the experiment is duplicated in field No. 22.

A new experiment was added under this head in order to observe the effect of tillage to various depths on wheat.

FIELD NO. 21. SUBJECT.—*Effect of tillage to various depths.*

Plot I.—Area ·27 acre. Ploughed (with the Swedish plough) every year.
„ II.— „ ·28 „ Bakhared (scarified) every year.
„ III.— „ ·28 „ Ploughed (with the Swedish plough) and bakhared in alternate years.
Commenced in 1890-91. Unirrigated and unmanured. Corp—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.							Gain in value on plot No. II.
	Average of five years, 1890-91 to 1894-95.		Average of preceding five years excluding 1899-00, 1895-96 to 1900-01.		1901-02.			
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Value.	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
I ...	398	761	207	379	106	191	5 7 6	1 7 10
II ...	503	1,031	192	365	76	152	3 15 8	...
III ...	582	1,073	285	548	84	237	4 10 4	0 10 8

FIELD NO. 22. SUBJECT.—*Effect of tillage to various depths.*

Plot I.—Area ·28 acre. Ploughed (with the Swedish plough) every year.
„ II.— „ ·28 „ Bakhared (scarified) every year.
„ III.— „ ·28 „ Ploughed (with the Swedish plough) and bakhared in alternate years.

Commenced in 1897-98. Unirrigated and unmanured. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.									Gain in value on plot No. II.
	1897-98.		1898-99.		1899-1900.	1900-01.		1901-02.		
	Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Value.
	lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
... ...	368	850	579	748	Wheat not sown owing to lack of moisture in the soil.	395	662	257	521	13 7 6	0 5 5
II	344	817	439	707		333	574	254	464	13 2 1	...
III	310	708	294	556		369	610	215	414	11 3 1	1 15 0

From the averages of the last ten years in field No. 21 it is observed that the plot ploughed and bakhared in alternate years has given the best results of the three. It is further observed that the land is giving a smaller outturn every year. In field No. 22 the plot ploughed yearly shows the best results, while the general results of the scarified plot are better than the third which is ploughed and bakhared in alternate years. Field No. 22 is not in accord with 21.

FIELD NO. 33. SUBJECT.—*Effect of tillage to various depths.*

Plot I.—Area ·39 acre. Bakhared (scarified) every year.
" II.— " ·39 " Ploughed by country nagar every year.
" III.— " ·39 " Ploughed by the Swedish plough every year.

Commenced in 1900-01. Unmanured. Crop—wheat (*haura*—Nagpur).

Number of plot.	OUTTURN PER ACRE.					Gain in value on plot No. I.
	1900-01.		1901-02.			
	Grain.	Straw.	Grain.	Straw.	Value.	
	lbs.	lbs.	lbs.	lbs.	Rs. a. p.	Rs. a. p.
I	361	627	259	574	13 12 1	...
II	458	590	277	598	14 10 4	0 14 3
III	529	925	317	650	16 10 4	2 14 3

The two years' results of the experiment are what might be expected. The plot ploughed with the Swedish plough has shown the best results, while that ploughed with the country plough comes second in point of outturn and the bakhared plot is the last.

VIII.—VARIETY OF CROPS.

Variety of crops.

14. The different crops grown on the Farm during the year under report were bajri (*pennisetum typhoidium*), sorghum (amber and collier), cotton of different kinds, maize, *paspalum dilatatum*, rice early and late.

15. The awned variety of bajri received from Poona is worthy of recommendation. This variety produces larger heads with larger and sweeter grains. Besides the presence of awns prevents birds from attacking the crop. The seed was collected and distributed to certain Deputy Commissioners for trial in the current season.

16. Sorghums (amber and collier) have become a great favourite of the Farm as fodder crops. They come to maturity early, and hence are very suitable to grow as catch crops in fields devoted to rabi crops, especially those with gram (*cicer arietinum*) and lakh (*lathyrus sativus*). If there is scarcity of fodder these crops are worth growing.

The greater portion of the crop on the Farm was reserved for ensilage, while the rest was utilized for seed purposes. Some of the seed has been supplied to the Deputy Commissioner, Nagpur, for trial.

Besides the Ganeri and Hulki juars usually grown on the Farm, 18 varieties of juar received from the office of Commissioner of Settlements and Agriculture were also grown first for testing their quality and second for securing botanical specimens for submission to the Reporter on Economic Products to the Government of India. Besides the specimens some seed was also collected for trial on the Farm in the current season.

17. The varieties of cotton grown on the Farm were Jari, Bani, Nimari, Upland Georgian, Garo Hill, Egyptian and Sea Island. The Egyptian and Sea Island cotton were sown in October in Nos. 31 and $\frac{35}{2}$ respectively. Gram was also drilled in with these varieties. The hot-weather pickings of the Egyptian variety did not yield much outturn. The plants grew very vigorous during the rains and gave every hope of a bumper crop. 400 lbs. of cotton per acre were obtained from the cold-weather pickings. The previous year's cotton which was allowed to remain on the land for one year more gave a very poor yield, amounting to 200 lbs. per acre.

Samples of the different cottons were sent for valuation to the Manager, Empress Mills, Nagpur, whose opinion and valuation is reproduced below :—

Abassai. Out of the three bags two contain good cotton with a silky long staple, colour white, strong and soft to the touch At the present rate of Egyptian we can rate it at Rs. 135 to 140 per boja. The other bags contain inferior stuff worth about Rs 1 -0

Metafifi —Two bags are good the third is inferior. Staple not so good as the Abassai; colour mixed valued at say Rs. 130 to Rs. 135. The remaining bag Rs. 90.

Bani.—Staple good, strong, average length, value Rs. 88.

Nimari.—Staple a little better than Bani, but the sample contains a little dirt, Rs. 90.

Upland Georgian.—Staple not strong, only as long as the Bani sample, colour good, value Rs. 90.

Jari.—Staple weak, not so white, value Rs. 68 to Rs. 69.

Garo Hill.—Slightly better than the Jari, colour white, value Rs. 71.

18. *Maize.*—Two varieties of maize, horsetooth and Jaunpur, were sown for seed purposes and the stalks utilized for ensilage. Jaunpur produces a big cob with plump, sweet and nutritious grains, while the grains of horsetooth are shrivelled and not so good. It has larger stalks, and is therefore better suited for fodder.

19. *Paspalum dilatatum.*—This grass, which has the reputation of being drought resistant, has not proved so on the Farm judged by the results of the last two years. It does, however, better on the Farm soil than on the Telinkheri Hill. Unless attention is paid to weeding, &c., it is smothered by the local grasses. It does not seem suitable for pasture land. Some of the local grasses are more hardy and resist drought better than the *paspalum dilatatum.* It will be again tried in the current season.

20. *Rice.*—The two varieties of rice halki (early) and chinur (late) were sown with the usual success. The early variety is worth cultivating, as it is ready for harvest 90 days after it is sown, and therefore enables a second crop either of gram or lakh being raised. It was sown broadcast on the Farm, while the variety chinur was transplanted.

21. *Ensilage.*—This system of preserving green fodder was tried in two ways :—

1st.—A stack 12 feet square by 12 feet high was built on a platform of earth raised one foot above the ground level. It was built of the stalks of sorghum (amber and collier) and maize. A layer of grass was spread on the top and big logs of wood were laid over it to press it down. The silo was opened in the month of February, and the mass, except one foot all round, was found in good condition and was very greedily eaten by the cattle.

The following compares the wastages of the whole mass stacked :—

12 × 12 × 12 = 1,728 whole mass stacked.
10 × 10 × 11 = 1,100 inside portion which was in good condition.

628 wastage.

mass stacked : wastage : : 1,728 : 628.

It is seen that the wastage in a silo of this size is little more than one-third. It would be an advantage if instead of small silos a big one were built up, because the larger the silo the less is the wastage, or the wastage may be said to vary inversely with the size of the silo.

Last year a closed silo measuring 9′ —3″ × 6′ —6″ on the inside by 7′ high was constructed in one of the corners of the godowns. At the bottom of this silo chopped pieces of prickly-pear, *Cactus Indicus* (Nagfani), were spread down, and over this the chopped sorghum (amber and collier) stalks were filled up. The material used sufficed to keep the silo air tight. This silo was also opened in February. The upper portions of the juar stalks, removed from one foot above the prickly-pear, were good and were eaten by the cattle, but that which was below had a rotten smell and the cattle naturally refused it. The cause was not far to find. The prickly-pear had rotted infected the mass of juar stalks above it. The idea of trying the prickly-pear ensilage was derived from one of the articles in the *American Agriculturist*, where they say that by ensilaging the prickly-pear, its thorns get softened, and it becomes a nutritious food for animals. But our experience is otherwise. In this experiment the thorns were not in any way softened although the pulpy matter was rotten.

IX.—EXPERIMENTS WITH PLANT DISEASES.

22. *Smut in Juar.*—The experiment of treating juar seed with a solution of copper sulphate before sowing, as a preventive against smut, was successful. Not a single ear was affected with the disease.

23. *Wheat Rust.*—A field was allotted for the cultivation of different varieties of wheat to test their rust-resisting properties. But in the absence of rust this year no result was gained. The different varieties of Farrer's wheats were grown as successfully as last year on a plot commanded by irrigation. Their rust-resisting power could not also be tested for the reason mentioned above.

The cross-bred variety of Haura-Mundia Pissi was grown and yielded a good quality of grain. Some new crosses have also been obtained this year :—

Female plant cross—fertilized.	Male from which pollen was taken.
Hybrid (farm)	Farrer's No. 26 ... ...
Do.	Do. 33 ... ...
Do.	Do. 39 ... ...
Do.	Do. 49 ... ...

Two year old seed was sown side by side with one year old seed as a test whether the former is rust-resistant. But the results are as yet uncertain as in other cases.

X.—TRIAL OF IMPLEMENTS.

24. All the implements tried last year were tried again in the year under report. An ensilage fodder cutter and shredder of American manufacture was added to the stock. It is a labour-saving machine and a very useful implement for cutting juar stalks into quarter inch lengths which cattle eat with great avidity. It effects a great saving in fodder, as nothing is wasted. It cuts very fast and is easy to work; a man working at the machine for half a day being able to produce chopped food for 30 head of cattle It is also a very good machine for cutting maize stems into lengths for ensilage purposes. A very sweet silage can thus be prepared out of the material that would otherwise be wasted.

A winnower from Messrs. Harder & Co. was obtained from America and tried on the Farm. Its work was splendidly light and perfect.

A turn-wrest plough of Messrs. Cooke and Sons, England, was received from the office of Inspector-General of Agriculture in India for trial on the Farm. Its work in heavy soil was efficient. It is so contrived that the bullocks can work and walk just as they are in the habit of doing with their country implements, whereas in the Swedish plough they have to walk all round the portion to be ploughed until the whole is finished. It is a very strong implement which worked satisfactorily in breaking the borders.

XI.—DISTRIBUTION OF SEEDS AND IMPLEMENTS.

Seed and Implements.

25. During the year under report seeds and implements were distributed to the under-mentioned gentlemen :—

Seeds.

Description of seed.	To whom supplied.
Maize seed, juar seed and bajri seed ...	Manager, Court of Wards, Nagpur.
Maize seed, juar seed, tur seed, castor seed, ambari seed, and Egyptian cotton seed.	Mr. Jamnadas Potdar of Nagpur.
Maize seed and juar seed	Mr. Haripant Bhawe of Nagpur.
Maize seed, juar seed, ambari seed and Egyptian cotton seed.	Mr. N. G. Mukerji, Manager, Sibpur Farm, Calcutta.
Maize seed, juar seed and san-hemp seed ...	Seth Ram Narayan Marwari, Cultivator of Nagpur.
Maize seed	Manager, Mehdibag Farm, Nagpur.
Do.	Mr. Anand Rao Brahmin, Cultivator of Nagpur.

Seeds.—(Contd.)

Description of seed.	To whom supplied.
Cotton seed, juar seed and popat seed	Mr. Ramswamy, Cultivator of Nagpur.
Cotton seed	Mr. Kesheo Rao Kher.
Maize seed	Superintendent, District Jail, Bilaspur.
Cotton seed	Mr. Lala Tekchand, Malguzar of Chhindwara.
Do.	Mr. Nirotamji Sheolal of Harda.
Juar seed	Deputy Commissioner, Bilaspur.
Do.	Do., Wardha.
Do.	Do., Chhindwara.
Do.	Do., Chanda.
Juar and Egyptian cotton seed	Secretary, B. N. Cotton Mills, Raj-Nandgaon.
Cotton seed	Secretary to Commissioner of Revenue Settlements and Agriculture, Madras.
Paddy seed and til seed	Deputy Commissioner, Damoh.
Paddy seed and Egyptian cotton seed	Director of Land Records and Agriculture, Bengal.
Paddy seed and juar seed	Mr. Kasinath Panda, Sambalpur.
Maize, popat, bajari and Egyptian cotton seed ...	Mr. Rao Ramsing, Zamindar of Bhamgarh, District Nimar.
Juar seed	Superintendent, Sibpur Farm, Hathwa, Bengal.
Paddy seed, popat seed, juar seed and wheat seed ...	Doctor Knapp, Special Commissioner of the Agricultural Department, U. S. of America.
Linseed	Director of Land Records and Agriculture, U. P. of Agra and Oudh.
Wheat seed (different kinds)	Assistant Superintendent, Government Farm, Surat.
Paspalum dilatatum seed	Superintendent, District Jail, Basim.
Egyptian cotton seed	Superintendent of Gardens, Darbhangai.
Do.	Director of Land Records and Agriculture, Burma.
Do.	Rev. K. Jwar, Betul.
Do.	Superintendent, Experimental Farm, Gondal.
Do.	Superintendent, Public Gardens, Raipur.
Do.	Mr. Sahiblal Sinra Tikary of Betul.
Do.	Manager, Indian Gardening Association, Calcutta.
Do.	Mr. Gangadhar Rao Chitnavis, C. I. E.
Do.	Mr. Murray, Harda.
Do.	Mr. Mahmadkhan Afgan, Zamindar of Samara Sind, Hyderabad.
Do.	Assistant Reporter on Economic Products to the Government of India.
Do.	Mr. Chandiprasad Dixit of Chanda.
Do.	Mr. A. Chatar, Postmaster, Purneah.
Hybridized wheat	Deputy Commissioner, Jubbulpore.
Do.	Do., Hoshangabad.
Do.	Do., Saugor.
Do.	Do., Seoni.
Do.	Do., Raipur.
Do.	Do., Narsinghpur.
Do.	Do., Betul.

Implements.

Description of implements.	To whom supplied.
Swedish plough	Seth Ram-Narayan Marwari of Nagpur.
Do.	Seth Narsinghdas of Mohgaon, District Chhindwara.
Winnower	Mr. Nago Rao Atmaram, Malguzar of Ghora, District Bilaspur.
Do.	Khan Saheb Hathidaroo of Seoni.
Bakhar and Meagher dragger	Director of Land Records and Agriculture, Bengal.
Implements consigned from America through the Farm.	
Ensilage fodder cutter and shredder	Manager, Mehdibag Farm, Nagpur.
Do. do.	Mr. Jamnadas Potdar, do.
Do. do.	Health Officer, Nagpur.
Do. do.	Mr. Gangadhar Rao Chitnavis, C. I. E.
Do. do.	„ Raghoba Ratiram of Saoner.
Do. do.	Assistant Superintendent, Government Farm, Poona.
Do. do.	Seth Narsinghdas of Mohgaon.
Winnower	Do.

XII.—CATTLE BREEDING.

26. The Mysore bull kept at the Farm has become too old for breeding purposes, but continues to be worked on the Farm in drawing the plough. The Honourable the Chief Commissioner has sanctioned the opening of a breeding farm at Telinkheri. The sheds are ready, and the cows which have been purchased will be brought after the rains. The main object of the Farm is to improve the breed of plough-cattle.

XIII.—FODDER AND FOREST RESERVES.

27. The Farm and gardens continue to draw their supply of grass from the reserve; the receipts and expenditure of the reserve are as follows:—

Expenditure.

	Rs.	a.	p.
Pay of two chowkidars in 1901-1902	131	8	6

Receipts.

(1) Value of grass supplied to garden	186	0	0
(2) Value of grass sold to the public	277	5	0
Total ...	463	5	0
Deduct cost of Establishment	131	8	6
Net profit ...	331	12	6

XIV.—SEWAGE FARM.

28. The season was favourable for the crops of the Kachi cultivators, and they have reaped good havests in both the seasons. The receipts and expenditure of the Sewage Farm during the year under report are given below :—

Receipts on account of rent including water-rate collection due in 1901-02.	Expenditure in 1901-02.
Rs. a. p.	Rs. a. p.
1,062 10 6	875 11 10

XV.—AGRICULTURAL CLASS.

29. The working of the Agricultural Class, Nagpur, has been separately reported upon. This year Mr. R. S. Joshi, the Principal, was placed on special duty from the 10th of February 1902, and Mr. H. R. Chakradeo was appointed Principal in addition to his own duties. Mr. Bhayalal, a student who was deputed to the Poona Science College, completed his course successfully, and was appointed Lecturer in Chemistry, Botany and Agriculture, *vice* Mr. R. S. Joshi.

There were in the Senior class eight students—one F. A., six Matrics and one Middle School. In the junior class there were only four students—all Matrics. The F. A. student was deputed to Poona with a scholarship of Rs. 20 per mensem.

The senior students were given one-fourth acre plots each for kharif and rabi cultivation. The juniors were given similar plots for rabi cultivation only. All the operations from the preparation of ground to the threshing of the crops were carried out by the students themselves. The seniors sowed cotton as kharif crop and til and linseed as rabi crops. The juniors sowed linseed and wheat as rabi crops. The sowing of cotton was completed in good time. The plants were thinned out and weeded by hand. Bullock hoes, such as Daura and Dundia, were also worked between the lines. The plants thrived very well, as the rainfall was seasonable for the crop. It yielded on an average 858 lbs. per acre, the average for the district being 240 lbs. per acre. Til and linseed crops thrived very well, but wheat did not. The rains this year ceased early, and there were no cold-weather showers to stimulate the growth of the crops. The area occupied by the crops was as follows:—

Kharif Crops.

Cotton	1½ acres.

Rabi Crops.

Til	1 acre.
Linseed	1 „
Wheat	¼ „

The total area which the students had under cultivation was 4¼ acres, and the sale-proceeds were appropriated by the students themselves according to the outturn of their own plots.

The principal visitors to the school were Mr. Muir Mackenzie of the Bombay Presidency; Mr. Mollison, Inspector-General of Agriculture in India; Mr. Pope, Director of Public Instruction, Burma; Sir Edward Law, Financial Secretary to the Government of India; Mr. Sly, Commissioner of Settlements and Agriculture, Central Provinces; and Mr. Munro, the Director of Public Instruction, Central Provinces.

As stated in the last year's report a new Boarding House is being built near Maharaj Bag and will be occupied by the students from the next session.

The Final and Annual Examinations were held from the 7th of April 1902 and subsequent days. The following gentlemen acted as Examiners:—

Subject.	Examiners.
Chemistry (Theory and Practice) ...	Professor P. N. Mukerji of the Morris College, Nagpur.
Botany and Geology ...	Mr. B. V. Joshi, D. Ag. (Bombay), Instructor, Normal Agricultural Class, Nagpur.
Veterinary ...	Mr. Jethiji, M. R. V. C. S., Superintendent, Civil Veterinary Department, Central Provinces.
Agriculture (Theory) ...	Mr. Mollison, M. R. A. C., Inspector-General of Agriculture in India.
Agriculture (Practice) ...	Mr. Sly, Commissioner of Settlements and Agriculture, Central Provinces.
Surveying (Theory and Practice) ...	Mr. Narayan Rao, Superintendent of Land Records, Nagpur.
Drawing ...	Mr. Dewaji Chintaman, Drawing Master, Normal School, Nagpur.

All the seniors passed the Final Examination, Shanker Damodar getting the usual silver medal for general proficiency. To encourage the study of practical agriculture, Rai Bahadur Chandra Kumar Chatterji kindly offered a silver medal to be awarded to the

senior class student who passes first in practical agriculture. Seven students appeared for the examination. The subjects prescribed for the examination were :—

Subject I.—Practical ploughing. Each student to take a pair of bullocks from the Farm shed and the pieces of a "bakhar," to put the pieces of the bakhar together with his own hands, yoke the bullocks and plough a plot of $\frac{1}{10}$th of an acre. Marks given for dexterity in handling the bullocks, and implement, for quickness of ploughing, and for the quality of ploughing judged by the straightness of the furrows and depth to which the soil is worked without leaving any gaps—Marks 25.

Subject II.—An oral examination held on the Farm in questions of practical agriculture connected with crops, methods of tillage, manures, &c.—Maximum Marks 25.

Subject III.—General practical work done on the farm during the year, including the raising of crops by the student with his own hand in his own plot—Maximum Marks 25.

The results of the examination are given below :—

Name of Student.	Subject I.	Subject II.	Subject III.	Total.
Tejnath	20	18	20	58
Shankar Damodar	20	18	16	54
Ramprasad	22	14	15	51
Beni Prasad	20	10	15	45
Sheikh Lal Mohamed	20	8	14	42
Balchand Barkar	25	Absent.	15	40
Vinayak Damodar	15	10	12	37

The medal has been awarded to Tejnath. Considering that this is the first competition, the results are fairly satisfactory. The students showed great interest in the competition, and it is hoped that the annual award of the medal will do much to raise the standard of the work. The result is interesting, for the student Tejnath, who did best in the practical work, stood lowest in the written paper on theoretical agriculture.

The second student, Nandkishore, who was sent to Poona in 1900, has passed the second examination in the agriculture of the Bombay University.

There are two divisions of the Normal Agricultural Class, one of which is situated in the building attached to the Agricultural Class and the other in the Training Institution at Takli up to 31st October 1901. From November the Takli class was brought to and trained in the main school buildings. This year there were many changes in the staff. Mr. T. K. Jakate was deputed to Chanda as Officiating Deputy Inspector of Schools, Mr. B. V. Joshi was appointed in his place; and Mr. Dandekar, a Graduate of the Poona Science College, was appointed in Mr. Joshi's place. Mr. Joshi fell ill in August and proceeded on six months' sick leave, and both the classes were managed by Mr. Dandekar till the 18th of November, when Mr. Hira Lal was appointed Assistant Instructor. Mr. Dandekar, however, left the service from January, and Mr. Hira Lal had to manage both the classes till the 14th of February 1902, when Mr. Joshi returned from leave.

Both the classes were opened in June 1901. The first batch consisted of 44 schoolmasters, out of whom 33 passed the Final Examination held on the 26th of October 1901 and obtained certificates. The second session of the class opened in November 1901 with 69 students. Out of these 31 were schoolmasters from different districts and 38 were ex-students from the Jubbulpore, Nagpur and Raipur Normal Schools. Out of the 69 who joined the class, 68 appeared for the Final Examination held on the 31st March 1902 and 64 duly passed the prescribed test and obtained certificates.

XVI.—FINANCIAL RESULTS.

30. The expenditure and receipts of the year on the Farm are shown below :—

	Expenditure.			Receipts.	Net cost.
	Salaries.	Contingencies.	Total.		
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Budget	4,788 0 0	4,612 0 0	9,400 0 0	2,500 0 0	6,900 0 0
Actuals	3,872 15 1	4,537 11 10	8,410 10 11	4,859 6 0	3,551 4 11

A detailed statement showing the various items of receipts and expenditure is printed as Annexure D.

TELINKHERI FARM.

31. History. The Telinkheri Garden was originally one of the Raja's gardens and was, after the annexation of the Nagpur country, declared nazul, *i.e.*, property of the State. The Telinkheri Garden was retained and continued to be managed by the Local Fund Committee until it was handed over to the Forest Department in 1872. In placing the garden under the management of the Forest Department Sir John Morris, then Chief Commissioner of the Central Provinces, gave that Department a large area attached to the gardens for the purpose of an experimental plantation. In making over the garden and the adjacent lands to the Forest Department, the Chief Commissioner had a twofold object in view, namely, first, that a well-preserved plantation of forest trees with good roads running through it and an ornamental garden in its midst would afford the public a pleasant place of recreation and would be greatly appreciated by the residents of the station; and, second, that one-fourth of the plantation would in course of time provide fuel and building timber to the Nagpur City. The Forest Department succeeded in raising a good growth of forest trees on the larger portion of the area received for the purpose, keeping a smaller portion for the cultivation of food crops. In later years the Forest Department have honeycombed the plantation by bringing several strips of land situated in different parts of the plantation under cultivation.

32. Management. The management of the Telinkheri Farm was handed over to the Superintendent, Experimental Farm, on the 1st June 1899. The establishment that has been entertained to work the farm consists of—

	Rs.
1 Overseer	30 per mensem.
1 Jamadar	6 „
2 Chowkidars	6 each per mensem.
11 Ploughmen at rates of pay, *viz.*	5 and 6 „
Total annual cost of establishment ...	1,308

The Farm is situated about two miles from Nagpur. The land is very uneven and stony in parts. 75·42 acres are under cultivation, the rest being occupied by forests and grazing lands. The fields are thoroughly drained.

33. Experiments. The only experiment conducted at Telinkheri Farm was to test the different methods practised in the provinces of cultivating rice. The following table gives the outturn of paddy sown according to the different methods:—

Method of sowing.	Area.	Outturn of paddy per acre.
	Acres.	lbs.
Sown broadcast ...	·25	777
Sown by seed drill ...	·27	805
Sown broadcast and then transplanted.	·27	1,498
Sown broadcast but ploughed under, locally termed *biyasi*.	·25	1,256

The land is not yet in a sufficiently good state of cultivation to render it suitable for experimental purposes.

The area and outturn of the following crops grown on the Farm is given below:—

Name of crops.	Area.	Outturn per acre.
	Acres.	lbs.
Cotton (jari) ...	23·98	439*
Juar ...	14·20	414
Tur ...	5·00	860
Til (rainy) ...	4·36	118
Til (winter) ...	3·35	35
Paddy ...	11·77	332
Linseed ...	6·46	126
Gram ...	4·49	831
Wheat ...	7·45	293
Safflower ...	3·64	577

* Seed cotton.

It will take some few years to get the land into proper order, and the crops at present are much injured by weeds, especially *kans*.

Financial results.

34. The expenditure and receipts of the year on the Telinkheri Farm are shown below:—

	RECEIPTS.					EXPENDITURE.						
							CONTINGENCIES.					
	Commercial sale of produce.	Rent of Government land.	Sale of grass (bir).	Miscellaneous.	Total.	Establishment.	Purchase of seeds and plants.	Purchase of cattle.	Purchase of implements.	Feed and care of cattle.	Miscellaneous.	Total.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1900-01 ...	742 11 2	40 0 0	94 14 3	424 2 0	1,301 11 5	1,081 15 3	...	...	76 3 0	211 8 6	76 6 8	1,446 1 5
1901-02 ...	1,321 5 6	71 0 0	399 5 9	759 10 3	2,551 5 6	945 8 7	...	1,350 0 0*	...	172 2 0	149 14 0	2,617 8 7

* Includes cost of bullocks and cows and construction of cattle-shed.

I have the honour to be,

Sir,

Your most obedient Servant,

BHAIYALAL DUBEY,

Offg. Superintendent, Government Experimental Farm.

LIST OF ANNEXURES.

A.—Statement showing the total areas under cultivation on the Experimental Farm, Nagpur, during 1901-02.

B.—Statement showing the average rates of the cost of cultivation on the Experimental Farm, Nagpur, during 1901-02.

C.—Statement showing the rates used for valuing the produce of the Experimental Farm, Nagpur, during 1901-02.

D.—Statement showing the comparison of receipt and expenditure of 1901-02 with that of 1900-01.

E.—Programme of experiments as it stood on the 1st June 1902.

Annexure A.

Total area under cultivation on the Experimental Farm, Nagpur, during the year 1901-02.

Crops.	Area.	Total.	Grand Total.
	Acres.	Acres.	Acres.
A.—EXPERIMENTAL AREA.			
(1) *Kharif*—			
Cotton alone	·50		
Cotton and tur	1·17		
Cotton and juar	·27		
Juar and tur	·13		
Juar	7·68		
Paddy	·48		
Maize	·25		
Kodon	·13		
		10·61	
(2) *Rabi*—			
Wheat	12·00		
Wheat and gram (birra)	·21		
Gram	·13		
Linseed	·70		
Til	·75		
Safflower	·80		
		14·59	25·20
B.—NON-EXPERIMENTAL AREA.			
(1) *Kharif*—			
Cotton	11·12		
Sorghum for fodder	3·52		
Maize for fodder	2·97		
Paddy	·27		
Tur	8·93		
Popat	·91		
Bajara	1·17		
		28·89	
(2) *Rabi*—			
Wheat	8·34		
Linseed	4·68		
Gram	1·79		
Til	3·58		
Peas	·15		
Castor	·62		
Safflower	·57		
		19·73	48·62
GRAND TOTAL	...	...	73·82

Annexure B.

Statement showing the average cost per acre of each operation of cultivation on the Experimental Farm, Nagpur, during the year 1901-02 *as deduced from the field cultivation book.*

[The hire of a pair of bullocks is taken as 12 annas; of a male cooly 3 annas; of a female cooly 1½ annas; and of a child 1 anna.]

Class of operation.	Detail.	Rate per acre. Rs. a. p.	Explanation.
Cost of tillage ...	Ploughing by Swedish plough ...	1 5 9	A pair of bullocks and a man for 1·45 days.
	Hoeing by bakhar (bullock hoe) ...	0 13 5	Do. do. for ·89 day.
	Weed hoeing by daura (small bullock weeding hoe).	0 10 1	Do. and 2 men for ·56 day.
	Weed hoeing by dundia (large bullock weeding hoe).	0 8 1	Do. do. for ·44 day.
	Weeding by hand ...	0 10 2	10 women for ·67 day.
Cost of sowing (including cost of seed).	Cotton by argarha (country drill hoe)	0 11 1	16 lbs. of seed (Re. 0-2-7). A pair of bullocks and a man and 3 women for ·43 day.
	Tur by argarha (country drill hoe) ...	1 1 9	17 lbs. of seed (Re. 0-12-3). A pair of bullocks and a man and 3 women for ·28 day.
	Juar by tifan (country drill) ...	0 10 1	14 lbs. of seed (Re. 0-7-9). A pair of bullocks and 2 men for ·13 day.
	Gram by nari nagar (drill plough) ...	2 4 3	40 lbs. of seed (Rs. 1-11-11). A pair of bullocks and 2 men for ·46 day.
	Linseed by tifan (country drill) ...	1 1 4	13 lbs. of seed (Re. 0-12-5). Two pairs of bullocks and 2 men for ·16 day.
	Wheat by nari nagar (drill plough) ...	6 11 4	100 lbs. of seed (Rs. 5-4-0). One pair of bullocks and 2 men for 1·29 days.
Cost of manure (excluding loading, carting and spreading).	Saltpetre ...	16 10 0	240 lbs. at Rs. 5-8-8 per maund.
	Bone-dust ...	3 6 0	360 lbs.—cost of collecting (Re. 0-8-0 per maund) and of crushing (Re. 0-4-0 per maund).
	Cattle-dung ...	10 0 0	160 maunds at Re. 0-1-0 per maund.
	Ashes of dung ...	11 0 8	160 maunds dung (at Re. 0-1-0 per maund) and drying and burning dung ashes (Re. 1-0 8 per acre).
	Green-manuring with san-hemp (*Crotolaria juncea*).	9 11 10	100 lbs. of seed (Rs. 3-12-0); sowing broad cast (Re. 0-1-8); covering seed by harrow (Re. 0-7-6), and cutting and ploughing (Rs. 5-6-8).
Cost of harvesting.	Picking cotton ...	1 3 8	2 women for 6·55 days each picking.
	Reaping juar ...	2 1 2	8 do. for 2·76 days.
	Do. gram ...	1 4 0	7 do. for 1·90 days.
	Do. linseed ...	1 0 8	5 do. for 2·22 days.
	Do. wheat ...	1 0 2	4 do. for 2·69 days.
Cost of threshing and cleaning.	Ginning cotton ...	4 0 0	2 men and 1 women for 8·53 days; average produce per acre 521·5 lbs. of seed cotton.
	Threshing and cleaning juar ...	0 6 2	1 man and 1 woman for 1·37 days; average produce per acre 321 lbs. of grain and 1,592 lbs. of karbi.
	Do. do. gram ...	3 2 0	4 bullocks, 1 man, 2 women and 2 boys for 1·56 days; average produce per acre 164 lbs. of grain and 805 lbs. of chaff.
	Do. do. linseed ...	1 15 3	4 bullocks, 1 man, 2 women and 2 boys for ·97 day; average produce per acre 108 lbs. of seed and 375 lbs. of stalks.
	Do. do. wheat ...	2 12 2	4 bullocks, 1 man, 3 women and 2 boys for 1·31 days; average produce per acre 367 lbs. of grain and 400 lbs. of straw.

Annexure C.

Statement showing the rates used for valuing the produce of the Experimental Farm, Nagpur, during the year 1901-02.

Name of produce.	Value.		Remarks.
	Rate.	Per.	
	Rs. a. p.		
Cotton lint	70 0 0	Bojha of 345 lbs.	
Cotton seeds	9 0 0	Khandi of 640 lbs.	
Juar ... Grain ...	11 8 0	Khandi of 390 lbs.	
Juar ... Karbi ...	45 0 0	Poolas 1,000 ...	About 3,460 lbs.
Tur ... Grain ...	13 0 0	Khandi of 421 lbs.	
Tur ... Stalks ...	0 12 0	8 bundles ...	About 560 lbs.
Tur ... Bhusa ...	1 8 0	One cart-load ...	About 478 lbs.
Gram ... Grain ...	12 0 0	Khandi of 390 lbs.	
Gram ... Chaff ...	1 8 0	One cart-load ...	About 478 lbs.
Linseed ... Seed ...	31 8 0	Khandi of 385 lbs.	
Linseed ... Stalks and bhusa ...	1 8 0	One cart-load ..	About 478 lbs.
Wheat (*haura*—Nagpur). Grain ...	18 0 0	Khandi of 400 lbs.	
Wheat (*haura*—Nagpur). Straw ..	1 12 0	One cart-load ...	About 478 lbs.

Annexure D.

Statement showing the comparison of Receipts and Expenditure of the Experimental Farm, Nagpur, of 1901-02 *with that of* 1900-01.

Receipts.	1900-01.	1901-02.	Remarks.	Expenditure.	1900-01.	1901-02.	Remarks.
	Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.	
Commercial sale of produce ...	787 3 3	1,225 2 9		Purchase of seeds and plants ...	96 9 9	1 11 0	
Distribution ... Seeds ...	52 12 3	481 7 11		Repairs of premises	877 15 6	1,394 5 0	Construction of cow-shed at Telinkheri Farm.
Distribution ... Implements ...	23 4 0	134 0 0					
Rent of Government land	722 12 3	791 2 7		Postage	5 6 0	20 5 0	
Sewage Farm	541 5 3	1,101 8 0		Service telegrams	...	0 8 0	
Miscellaneous	645 15 9	1,126 0 9		Country stationery	0 6 9	0 5 0	
				Purchase of books	...	13 8 9	
				Do. of cattle	...	1,500 0 0	Purchase of bullocks and cows.
				Do. of implements	139 9 9	41 7 0	
				Repairs of tools and implements ...	25 14 6	111 4 9	
				Feed and care of cattle	426 10 0	194 10 0	
				Irrigation	...	2 4 3	
				Manure	11 10 6	49 1 6	
				Variable labours, agricultural ...	67 15 0	73 4 0	
				Do., earth-work, &c. ...	...	...	
				Packing and freight	90 8 7	61 0 9	
				Sewage Farm	884 2 6	875 11 10	
				Binding charges... ...	1 8 0	0 8 0	
				Other miscellaneous charges ...	102 0 10	175 9 0	
				Total ...	2,730 5 8	4,515 7 10	
				Establishment	4,508 10 10	3,872 15 1	
				Total ...	4,508 10 10	3,872 15 1	
				Travelling allowance	172 3 0	22 4 0	
				Total ...	172 3 0	22 4 0	
GRAND TOTAL ...	2,773 4 9	4,859 6 0		GRAND TOTAL ...	7,411 3 6	8,410 10 11	

Annexure E.

Programme of Experiments of the Experimental Farm, Nagpur, as it stood on the 1st June 1902.

Number of field.	Purpose of experiment.	Crop.			Special treatment.			Remarks.
		1st year.	2nd year.	3rd year.	1st year.	2nd year.	3rd year.	
A—I	Continuous manure experiments with irrigated wheat.	Wheat ...	Wheat ...	Wheat ...	Saltpetre (40 lbs. nitrogen per acre).	Same as in first year.	Same as in first year.	
II		Do. ...	Do. ...	Do. ...	Bone-dust (do.) ...			
III		Do. ...	Do. ...	Do. ...	Saltpetre and bone-dust (25 bs. of saltpetre and 15 lbs. of bone-dust).			
IV		Do. ...	Do. ...	Do. ...	Cattle-dung (40 lbs. nitrogen per acre).			
V		Do. ...	Do. ...	Do. ...	Cattle-dung and bone-dust (25 lbs. of cattle-dung and 15 lbs. of bone-dust).			
VI		Do. ...	Do. ...	Do. ...	Ashes of cattle-dung containing 40 lbs. nitrogen per acre.			
VII		Do. ...	Do. ...	Do. ..	Unmanured.			
VIII		Do. ..	Do. ...	Do. ...	Green manured with san (seed 100 lbs. per acre).			
IX		Do. ...	Do. ...	Do. ...	Manured with Kadojira (tillage as in plot 8).			
X		Do. ...	Do. ...	Do. ...	Saltpetre (20 lbs. nitrogen per acre).			
XI		Do. ...	Do. ...	Do. ...	Do. (top dressing).			
XII		Do. ...	Do. ...	Do. ...	Farm-yard manure (40lbs. nitrogen per acre).			
B—I	Continuous manure experiments with dry crop wheat.	Wheat ...	Wheat ...	Wheat ...	Saltpetre (40 lbs. nitrogen per acre).	Do. ...	Do. ..	
II		Do. ...	Do. ...	Do. ...	Bone-dust (do.)			
III		Do. ...	Do. ...	Do. ...	Saltpetre and bone-dust (25 lbs. of saltpetre and 15 lbs. of bone-dust).			
IV		Do. ...	Do. ...	Do. ...	Cattle-dung (40 lbs. nitrogen per acre).			
V		Do. ...	Do. ...	Do. ...	Cattle-dung and bone-dust (25 lbs. of cattle-dung and 15 lbs. of bone-dust.			
VI		Do. ...	Do. ...	Do. ...	Ashes of cattle-dung containing 40 lbs. nitrogen per acre.			

VII		Do. ...	Do. ...	Do. ...	Unmanured ...			
VIII		Do. ...	Do. ...	Do. ...	Green manured with san (seed 100 lbs. per acre).			
IX		Do. ...	Do. ...	Do. ...	Manured with Kadoojira (tillage as in plot 8).			
X		Do. ...	Do. ...	Do. ...	Saltpetre 20 lbs. nitrogen per acre.			
XI		Do. ...	Do. ...	Do. ...	Do. top dressing.			
XII		Do. ...	Do. ...	Do. ...	Farm yard manure 40 lbs. nitrogen per acre.			
C—I	Effect on irrigated wheat of manure applied in June and August.	Wheat ...	Wheat ...	Wheat ...	Cattle dung 40 lbs. nitrogen per acre in June.	Same as in first year.	Same as in first year.	
II		Do. ...	Do. ...	Do. ...	Do. in August ...			
III	Do. ...	Do. ...	Do. ...	Do. ...	Do. in June ...	Do. ...	Do. ...	
IV		Do. ...	Do. ...	Do. ...	Do. in August ...			
F—I	Effect of rotation ...	Wheat ...	Wheat ...	Wheat ...	*Nil.* ...	*Nil.* ...	*Nil.* ...	Plots to be manured every fourth year with light dressing of farm-yard manure containing 40 lbs. nitrogen per acre. Regular irrigation to be given.
II		Do. ...	Lakh ...	Do. ...				
III		Do. ...	Gram ...	Do. ...				
IV		Wheat and gram mixed.	Wheat and gram mixed.	Wheat and gram mixed.				
V		Wheat with subordinate rows of safflower.	Wheat with subordinate rows of safflower.	Wheat with subordinate rows of safflower.				
VI		Wheat ...	Sessamum ...	Wheat ...				
G—I	Rotation, coriander and linseed.	Coriander ...	Linseed ...	Coriander ...	*Nil.* ...	*Nil.* ...	*Nil.* ...	Light dressing of farm-yard manure every fourth year and to irrigate to save the crop withering during drought year.
II		Linseed ...	Coriander ...	Linseed ...				
H—I	Dry crop rotations with wheat.	Wheat ...	Wheat ...	Wheat ...	*Nil.* ...	*Nil.* ...	*Nil.* ...	To be manured lightly every fourth year with farm-yard manure containing 40 lbs. nitrogen. Light irrigation if absolutely necessary.
II		Do. ...	Lakh ...	Do. ...				
III		Do. ...	Gram ...	Do. ...				
IV		Wheat and gram mixed.	Wheat and gram mixed.	Wheat and gram mixed.				
V		Wheat with subordinate rows of safflower.	Wheat with subordinate rows of safflower.	Wheat with subordinate rows of safflower.				
VI		Wheat ...	Sessamum ...	Wheat ...				
E—1	Effect of tillage to various depths on irrigated wheat grown continuously.	Wheat ...	Wheat ...	Wheat ...	Scarified every year.	Same as in first year.	Same as in first year.	Plots to be manured with farm-yard manure containing 40 lbs. nitrogen every fourth year.
2		Do. ...	Do. ...	Do. ...	Ploughed with one country plough and scarified.			
3		Do. ...	Do. ...	Do. ...	Ploughed with Swedish plough and scarified.			
D—1	Effect on cotton and juar-tur in rotation of manure.	Cotton ...	Juar-tur (mixed)	Cotton ...	Bone-dust (40 lbs. nitrogen per acre).			
2		Do. ...	Do. ...	Do. ...	Unmanured.			
3		Do. ...	Do. ...	Do. ...	Farm-yard manure (40 lbs. nitrogen per acre).			
4		Do. ...	Do. ...	Do. ...	Farm-yard manure (20 lbs. nitrogen per acre).			

Digitized with financial assistance from
Hemendra Kothari
on 24 February, 2020

Programme of Experiments of the Experimental Farm, Nagpur, as it stood on the 1st June 1902.—(Concld.)

Number of field.	Purpose of experiment.	Crop.			Special treatment.			Remarks.
		1st year.	2nd year.	3rd year.	1st year.	2nd year.	3rd year.	
D—5	Effect on cotton and juar-tur in rotation of various manure.	Cotton ...	Juar-tur (mixed).	Cotton ...	Poudrette (40 lbs. nitrogen per acre).			
—6		Do. ...	Do. ...	Do. ...	Saltpetre (40 lbs. nitrogen per acre).			
—7		Do. ...	Do. ...	Do. ...	Saltpetre (20 lbs. nitrogen as top-dressing per acre).	...	...	
—8		Do. ...	Do. ...	Do. ...	Bone-dust and saltpetre (15 lbs. nitrogen in bone-dust and 25 lbs. of nitrogen in saltpetre per acre).			
1—1	Rotation experiments with kharif crops.	Cotton-tur ...	Cotton-tur ...	Cotton-tur ...	*Nil.*	*Nil.*	*Nil.*	To be lightly manured in the year in which cotton is grown with farm-yard manure 40 lbs. nitrogen per acre. Irrigation to be given on rabi crops to save withering.
2		Do. ...	Juar ...	Do. ...				
3		Do. ...	Sessamum ...	Do. ...				
4		Cotton ...	Cotton ...	Cotton ...				
5		Cotton-juar ...	San as fibre crop.	Cotton-juar ...				
6		Cotton ...	Juar ...	Cotton ...				
7		Cotton-juar ...	Wheat ...	Cotton-juar ...				
8		Do. ...	Gram ...	Do. ...				
9		Do. ...	Wheat and gram mixed.	Do. ...				
J—1	Manures on juar with subordinate tur continuously without rotation.	Juar-tur ...	Juar-tur ...	Juar-tur ...	Saltpetre (20 lbs. nitrogen per acre drilled).			
2		Do. ...	Do. ...	Do. ...	Unmanured.			
3		Do. ...	Do. ...	Do. ...	Cattle-dung (20 lbs. nitrogen per acre drilled).	...		
4		Do. ...	Do. ...	Do. ...	Saltpetre (20 lbs. nitrogen per acre top-dressed).			

Secretariat Press, Nagpur:—J. E. A., 3-1-1903—380.